Addendum
Priest River Subbasin Assessment And Total Maximum Daily Load

April 2003

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Abbreviations, Acronyms, and Symbols

303(d)	Refers to section 303 subsection (d) of the Clean Water Act, or a list of impaired water bodies required by this section
µ	micro, one-one thousandth
§	Section (usually a section of federal or state rules or statutes)
AWS	agricultural water supply
BAG	Basin Advisory Group
BMP	best management practice
BOD	biochemical oxygen demand
BURP	Beneficial Use Reconnaissance Program
C	Celsius
CFR	Code of Federal Regulations (refers to citations in the federal administrative rules)
cfs	cubic feet per second
cm	centimeters
CWA	Clean Water Act
CWAL	cold water aquatic life
CWE	cumulative watershed effects
DEQ	Idaho Department of Environmental Quality
DO	dissolved oxygen
DWS	domestic water supply
EPA	United States Environmental Protection Agency
EPT	ephemeroptera – plecoptera – trichoptera (macroinvertebrate taxa)
F	Fahrenheit
FPA	Idaho Forest Practices Act
FS	Fully Supporting
GIS	Geographical Information Systems
HUC	Hydrologic Unit Code
IDAPA	Refers to citations of Idaho administrative rules
IDFG	Idaho Department of Fish and Game
IDL	Idaho Department of Lands
IDWR	Idaho Department of Water Resources
IPNF	Idaho Panhandle National Forests
IREAF	Idaho River Ecological Assessment Framework
LA	load allocation
LC	load capacity
LWD	Large woody debris
m	meter
m^2	square meters
mi	mile

mi^2	square miles
mg/l	milligrams per liter
mm	millimeter
MOS	margin of safety
MWMT	maximum weekly maximum temperature
n.a.	not applicable
NA	not assessed
NB	natural background
nd	no data (data not available)
PCR	primary contact recreation
ppm	part(s) per million
NFS	Not Fully Supporting
NRCS	Natural Resources Conservation Service
NTU	nephlometric turbidity unit
RDI	DEQ's river diatom index
RFI	DEQ's river fish index
RMI	DEQ's river macroinvertebrate index
RPI	DEQ's river physiochemical index
RNA	Research Natural Area
SBA	subbasin assessment
SCR	secondary contact recreation
SFI	DEQ's stream fish index
SHI	DEQ's stream habitat index
SMI	DEQ's stream macroinvertebrate index
SS	salmonid spawning
TDS	total dissolved solids
TIN	total inorganic nitrogen
TKN	total Kjeldahl nitrogen
TMDL	total maximum daily load
TP	total phosphorus
TS	total solids
TSS	total suspended solids
tons/yr	tons per year
USFS	United States Forest Service
USGS	United States Geological Survey
WAG	Watershed Advisory Group
WBAG	*Waterbody Assessment Guidance*
WBID	waterbody identification number
WLA	wasteload allocation
WRP	Wetland Reserve Program

ERRATA
Addendum Priest River Subbasin Assessment and Total Maximum Daily Load

The relevant information for Implementation Strategies pursuant to the TMDL Settlement Agreement of July 2002 for each of the five TMDLs presented in the *Addendum* can be found on the following Sections and pages:

1. 5.1 Sediment TMDL for Reeder Creek
   Section 5.1.4 beginning on page 84.
   a. **Time Frame**: Table 19, page 86.
   b. **Approach**: Pollution Control Strategies, page 85 and Additional Improvements not Directly Related to Sediment Delivery, page 87.
   c. **Responsible Parties**: Table 19, page 86.
   d. **Monitoring Strategy**: Monitoring Provisions, page 86.

2. 5.2 Sediment TMDL for Binarch Creek
   Section 5.2.4 beginning on page 93.
   a. **Time Frame**: Table 22, page 95.
   b. **Approach**: Pollution Control Strategies, page 95.
   c. **Responsible Parties**: Table 22, page 95.
   d. **Monitoring Strategy**: Monitoring Provisions, page 95.

3. 5.3 East River Sediment TMDL
   Section 5.3.4 beginning on page 105.
   a. **Time Frame**: Table 26, page 107.
   b. **Approach**: Pollution Control Strategies, page 107 and Additional Improvements not Directly Related to Sediment Delivery, page 108.
   c. **Responsible Parties**: Table 26, page 107.
   d. **Monitoring Strategy**: Monitoring Provisions, page 108.

4. 5.4 East River Temperature TMDL
   a. **Time Frame**: Section 5.4.1 Instream Water Quality Targets, pages 111 and 112.
   b. **Approach**: Section 5.4.1 Instream Water Quality Targets, pages 111 and 112.
   c. **Responsible Parties**: Table 30, page 118.
   d. **Monitoring Strategy**: Monitoring Points, page 113.

5. 5.5 Lower Priest River Sediment TMDL
   Section 5.5.4 beginning on page 130.
   a. **Time Frame**: no reasonable estimate of a time frame.
   b. **Approach**: Pollution Control Strategies, page 134 and Additional Improvements not Directly Related to Sediment Delivery, page 135.
   c. **Responsible Parties**: Table 34, page 132.
   d. **Monitoring Strategy**: Monitoring Provisions, page 134.

Executive Summary

The federal Clean Water Act (CWA) requires that states and tribes restore and maintain the chemical, physical, and biological integrity of the nation's waters (33 USC § 1251.101). States and tribes, pursuant to section 303 of the CWA are to adopt water quality standards necessary to protect fish, shellfish, and wildlife while providing for recreation in and on the waters whenever possible. Section 303(d) of the CWA establishes requirements for states and tribes to identify and prioritize water bodies that are water quality limited (i.e., water bodies that do not meet water quality standards). States and tribes must periodically publish a priority list of impaired waters, currently every two years. For waters identified on this list, states and tribes must develop a total maximum daily load (TMDL) for the pollutants, set at a level to achieve water quality standards.

In October 2001, a *Priest River Subbasin Assessment and TMDL* was published (Rothrock 2001) and forwarded from DEQ to EPA for review and approval. In March 2002 EPA approved sediment TMDLs for two of the §303(d) listed watersheds: Kalispell Creek and Lower West Branch Priest River. The *Priest River SBA and TMDL* also included a request for a short term delay of beneficial use support status calls and TMDLs where required for four of the listed segments (Table B). Reasons for this request mostly stemmed from the need for further data collection and analysis. This *Addendum* document addresses the water bodies in the Priest River Subbasin that have been placed on what is known as the "§303(d) list," and received short term delay of beneficial use support status calls.

The *Priest River Subbasin Assessment and TMDL* analysis was developed to comply with Idaho's TMDL schedule. This assessment describes: the physical, biological, and cultural setting; water quality status; pollutant sources; and recent pollution control actions in the Priest River Subbasin located in the northwest corner of Idaho. The first part of this document, the subbasin assessment, is an important first step in leading to the TMDL. The starting point for this assessment was Idaho's current §303(d) list of water quality limited water bodies. Ten segments of the Priest River Subbasin were listed on this list. The subbasin assessment portion of this document examines the current status of §303(d) listed waters, and defines the extent of impairment and causes of water quality limitation throughout the subbasin. The loading analysis quantifies pollutant sources and allocates responsibility for load reductions needed to return listed waters to a condition of meeting water quality standards.

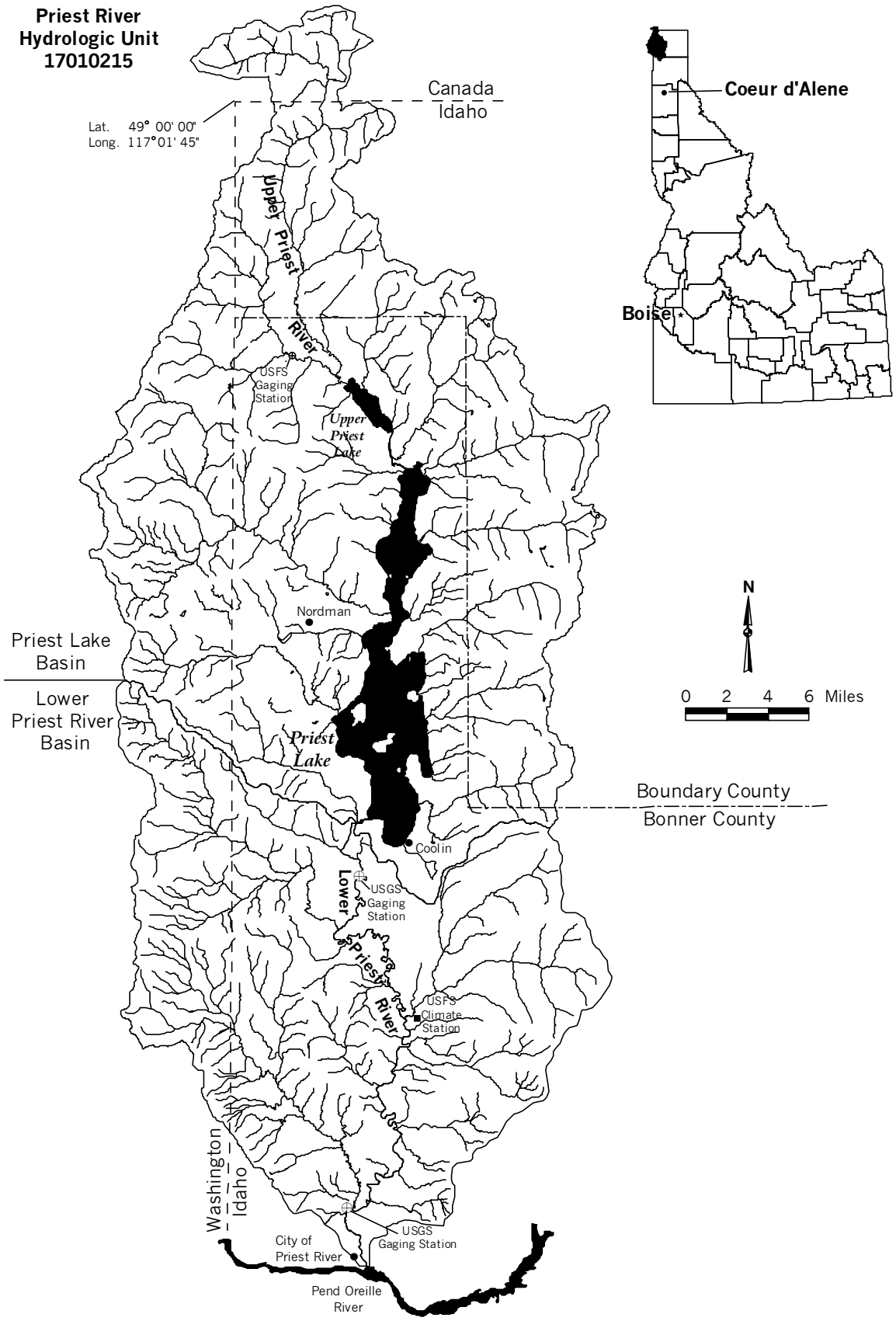

Figure A. Location map of Priest River Subbasin.

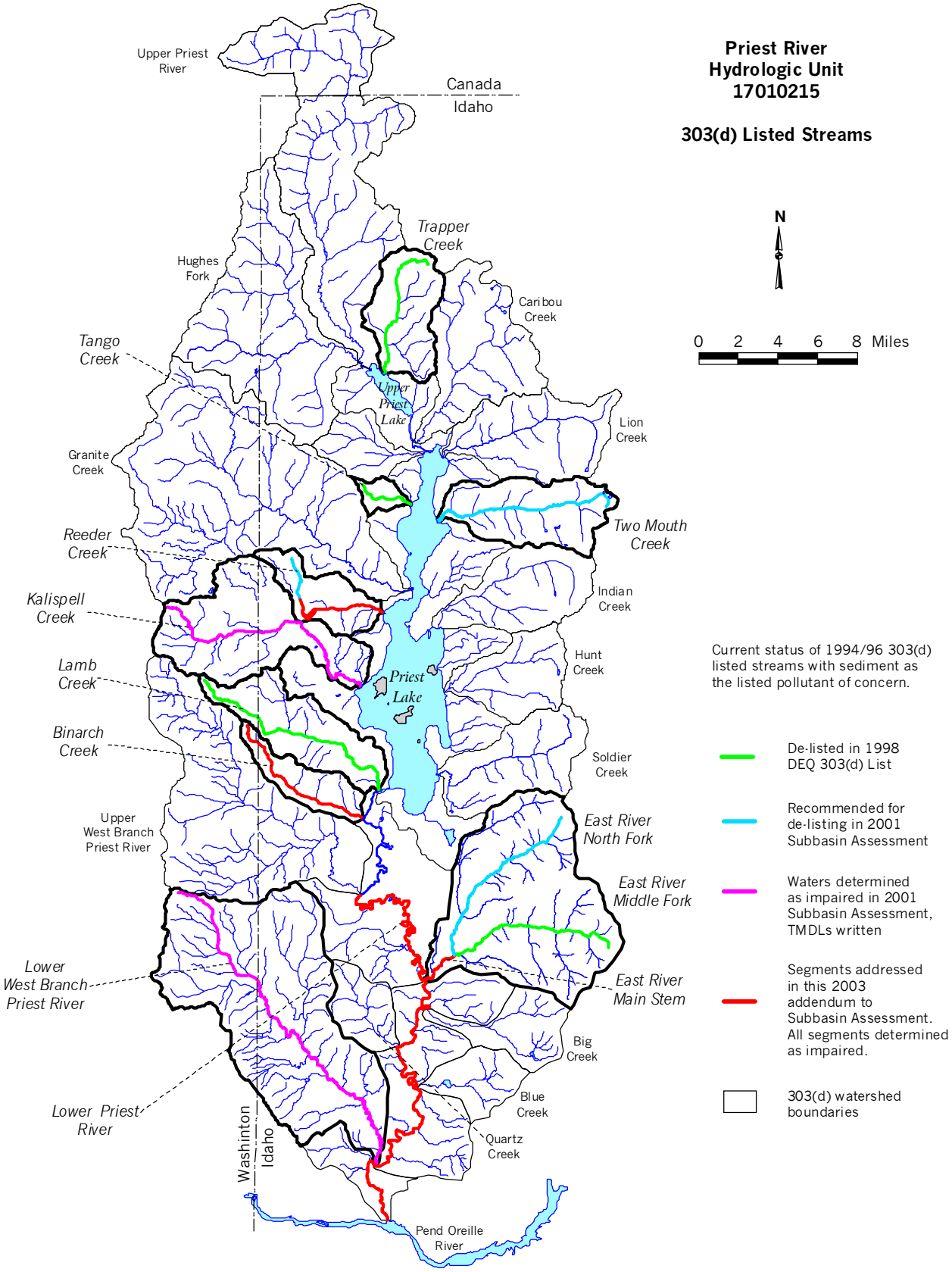

Figure B. §303(d) listed stream segments of the Priest River Subbasin.

Subbasin at a Glance

Hydrologic Unit Code .....17010215 – Priest River Subbasin (Figure A)

Listed Water Quality Limited Segments .....Reeder Creek from elevation 2680 ft to mouth, Binarch Creek, East River main stem, and Lower Priest River, all listed for sediment; and East River for temperature (see Figure B)

Beneficial Uses Affected .....Cold water aquatic life, salmonid spawning

Pollutants of concern .....Sediment, heat (solar radiation)

Streams requiring TMDLs .....Reeder Creek, Binarch Creek, East River, and Lower Priest River for sediment, East River for water temperature.

Key indicators of impairment .....Integrated WBAG II index scoring for cold water aquatic life (macroinvertebrates and fish), and stream habitat, indicating Not Fully Supporting.

Known land uses .....Forestry, agriculture, rural residential

Comments to Draft *Addendum* Report and Major Changes Made

The draft *Addendum* report was published in September 2002 with document distribution as shown in Appendix C. There was an advertised public comment period from October 7 through November 8 (Appendix D), as well as discussion of comments received and a public forum for further comments at a December 5th meeting of the Panhandle Basin Advisory Group (BAG). Based on comment packages received from the EPA, Alliance for the Wild Rockies, Kootenai Environmental Alliance, and the DEQ Technical Services unit in Boise (Appendix D), two major changes were made to the draft *Addendum* as incorporated in a revised draft and this final report. Because of changes in recommendations regarding the §303(d) list along with inclusion of two sediment TMDLs not presented in the original draft, DEQ decided to provide another 30 day public comment period for review of a revised draft (February 5 to March 7, 2003).

The draft *Addendum* recommended that Binarch Creek be removed from the §303(d) list with sediment as the pollutant of concern. Comments received disputed this recommendation, citing a 1998 USFS field survey (USFS 1998) that depicted moderate to high percent fines in many upper reach spawning gravels of a pure strain westslope cutthroat population, and poor pool quality due to filling in by sediment. Also cited was a significant watershed disturbance of timber cuts and associated roads between 1960 –1996. Based on these comments, Binarch Creek is retained on the §303(d) list and a sediment TMDL was presented in the revised draft.

The draft *Addendum* also recommended that sediment be removed as a pollutant of concern from the §303(d) listing for Lower Priest River. Evidence suggests that there has been a decline in the cold water fishery of the river, particularly the fluvial cutthroat fishery. The draft *Addendum*

presented a case that sediment was not the primary cause for cold water fishery impairment. This was based on excellent scores of the DEQ River Macroinvertebrate Index and River Diatom Index, and because other factors such as warm water temperatures, degradation within tributary spawning habitat, and competition from non-native salmonids, are thought to be more prevalent as impairment causes. Comments received cited the draft report as acknowledging a high sediment load from eroding riverbanks and three of the major tributary watersheds. The comments concluded that sediment could not be discounted as a contributing cause to impairment. The revised draft *Addendum* reflected those comments by keeping sediment listed for the river and preparing a sediment TMDL.

Only one comment of significance was received during the comment period of the revised draft *Addendum*. This comment was from Stimson Lumber Company (Appendix D) regarding evaluation of Stimson operations in the Redder Creek sediment TMDL. The comment letter pointed to omission of a 5 mile road network within a Stimson land block at the southeastern portion of the Reeder Creek watershed (section 25, Figure 3c). This road network inclusion resulted in a recalculation of the Reeder Creek TMDL (Section 5.1).

Key Findings

Table A. Streams and Pollutants for which TMDLs were Developed

Stream	Pollutant(s)
Reeder Creek	Sediment
Binarch Creek	Sediment
East River main stem (TMDL for entire watershed)	Sediment
East River main stem, Middle Fork East River, North Fork East River	Heat (incoming solar radiation)
Lower Priest River	Sediment

Reeder Creek from Elevation 2680 ft to Mouth

Reeder Creek is a 2nd order tributary on the west side of Priest Lake (Figure B), flowing south and then due east to the lake. Main stem length is 7.7 miles and watershed size is 8,454 acres. Ownership/management within the watershed is 73% Idaho Panhandle National Forests (IPNF) under USFS management, 20% private agricultural and residential property, and 7% industrial timber lands.

The headwaters of the stream down to elevation 2680 ft was determined as Full Support of cold water aquatic life beneficial (CWAL) use in the *Priest River SBA and TMDL* (Rothrock 2001). From elevation 2680 ft to near the mouth is a 5 mile segment of mainly low gradient channel,

Table B. Summary of Subbasin Assessment Outcomes

Waterbody Segment	Water Quality Limited Segment #, and Idaho Water Body Identification Assessment Unit #[a] ID17010215…	Pollutant	TMDL(s) Completed	Recommended Changes to §303(d) List	Recommended Schedule Changes	Justification
Reeder Creek	3424, PN023_02 PN023_03	Sediment: listed in 1994	1 (for entire watershed)	None	None	n.a.
Reeder Creek	3424, PN023_02 PN023_03	Heat: temperature listed in 1998	None	None	Temperature TMDL due in 2007	By agreement, initial temp. listing in 1998 DEQ §303(d) list does not require TMDL until 2007.
Binarch Creek	3418, PN026_02	Sediment: listed in 1994	1	None	None	n.a.
Binarch Creek	3418, PN026_02	Heat: temperature not listed	None	List for temperature in 2002/03 DEQ §303(d) list	Temperature TMDL due in 2007	By agreement, initial temp. listing in 2002/03 DEQ §303(d) list does not require TMDL until 2007.
East River main stem	3415, PN003_04	Sediment listed in 1994	1 (for entire watershed)	None	None	n.a.
East River: Middle Fork, North Fork, main stem	3415, PN003_02 & _03 PN004_02 & _03 PN003_04	Dissolved oxygen: listed in 1994	None	De-list DO in 2002/03 DEQ §303(d) list	None	DO measurements in 2001 show levels above standards criteria.
East River: Middle Fork, North Fork, main stem	3415 PN003_02 & _03 PN004_02 & _03 PN003_04	Heat: temperature listed in 1994	1	None	None	n.a.
Lower Priest River	3407, PN001_05	Sediment: listed in 1994	1	None	None	n.a.
Lower Priest River	3407, PN001_05	Heat: temperature not listed	None	List for temperature in 2002/03 DEQ 303(d) list.	Temperature TMDL due in 2007	By agreement, initial temp. listing in 2002/03 DEQ §303(d) list does not require TMDL until 2007.

a = In the 1998 DEQ §303(d) List, water body segments were identified with a Water Quality Limited Segment Number. Following the 1998 list, an Idaho Water Body Identification System (WBID) was developed to more uniquely code Idaho waters. The WBAG II document (Grafe *et al*. 2002) described the WBID along with Water Body Stratification, a classification method that adds a sub-identifier to the WBID number, called an Assessment Unit (AU). Taking Reeder Creek as an example, WBID = ID17010215PN023_02, where the _02 is an AU for the 2nd order segments of Reeder Creek, and _03 is the AU for the 3rd order segments.

0.4 - 1% slope, flowing through a broad floodplain of wetlands and wet meadows. This segment was delayed for a beneficial use status call until all results from a BURP survey in 2000 were analyzed and reported.

The 2000 BURP site was placed in the middle stream segment as Reeder Creek flows through Bismark Meadows (around 1,200 acres in size). While once a contiguous wetland and wet meadows, a large portion of Bismark Meadows has been converted to hay cropping and grazing. Impacts to Reeder Creek within this lowland have included: the development of extensive cross ditches to facilitate drainage of the meadows for hay cropping; stream channel straightening; removal of riparian shrub overstory by hay cropping and large animal grazing; and some streambank damage by grazing animals. The stream bottom is predominately silt-sand.

The stream index scoring for the above BURP site, from the DEQ *Waterbody Assessment Guidance*, second edition (WBAG II, Grafe *et al*. 2002) is as follows:

- Stream Macroinvertebrate Index (SMI) = 21, or Condition Rating = Minimum Threshold (SMI < minimum reference condition),

- Stream Fish Index (SFI) = 39, or Condition Rating = 1, and

- Stream Habitat Index (SHI) = 52, or Condition Rating = 1.

The WBAG II preliminary beneficial use assessment for CWAL is Not Fully Supporting based on the SMI score of Minimum Threshold. A low SMI score might be expected from the Reeder Creek site because of a meadow stream with minimal fast water riffle habitat. However, results of the BURP electro-fishing were below the minimum subbasin targets. Stream habitat was also marginal with an absence of woody debris in the channel and poor riparian cover. This assessment thus concludes that the WBAG II stream index scoring properly depicts a condition of Not Fully Supporting.

While the headwaters segment down to elevation 2680 ft is judged as CWAL = FS, the upper and middle reaches of Reeder Creek have been placed within the same Assessment Unit (see footnote of Table B). When there are two BURP evaluation sites in the same AU, DEQ uses the lower multimetric index score to interpret aquatic life use support (Grafe *et al*. 2002). Since CWAL = NFS for the middle BURP site, the upper reach remains as a portion of Reeder Creek on the §303(d) list, and is included in the Reeder Creek sediment TMDL.

A sediment TMDL for the entire Reeder Creek watershed was prepared (Section 5.1). Natural background sediment load was estimated at 310 tons/year. Load capacity for the Priest River Subbasin is set at 50% above background which includes a margin of safety (Rothrock 2001), or 465 tons/yr for the Reeder Creek watershed. Existing sediment load was estimated at 600 tons/yr, or 93% above background. Sediment load allocations and sediment reduction allocations were made to the three ownership/management entities in the watershed.

Under the current guidance of WBAG II and additional considerations, the appropriate measures of Full Support for Reeder Creek include: 1) scores of SMI, SFI, and SHI which integrated together produce an average Condition Rating score ≥ 2.0, 2) a total salmonid density at the minimum target levels of 5 – 10 total trout/100 m^2, 3) presence of sculpins, and 4) in addition to

the biological and habitat measures above, the TMDL Implementation Plan may address fisheries management objectives regarding native resident cutthroat trout and possibly spawning of Priest Lake adfluvial cutthroat trout.

While a sediment TMDL is required by the Not Fully Supporting status call, there appears to be limited opportunities for significant sediment reduction from the unpaved road network. It is believed that a newly established Wetland Reserve Project (WRP) within Bismark Meadows, under the administration of the National Resources Conservation Service (see Chapter 4), is an important implementation program that holds promise for habitat improvement within the middle segment of Reeder Creek. Restoration of historic wetland and floodplain function, including meander and beaver activity, and the planting of streamside vegetative cover, could well be the primary mechanism to restore instream beneficial uses.

Lastly, a temperature sensor was placed in Reeder Creek by the USFS in 2001. The data showed exceedances (greater than 10% exceedance frequency) of the Idaho water quality standards numeric temperature criteria for cutthroat trout and bull trout spawning and incubation. Under the guidelines of WBAG II, a temperature TMDL is required for Reeder Creek. Based on a negotiated TMDL settlement schedule, the due date for a Reeder Creek temperature TMDL is 2007 (Table B).

Binarch Creek

Binarch Creek is a 2nd order tributary on the west side of Lower Priest River (Figure B), flowing southeast to the river. Main stem length is 8.6 miles, and watershed size is 7,232 acres. The entire watershed is IPNF land under USFS management. Binarch Creek was delayed for a beneficial use status call until USFS conducted an electro-fishing survey, which was accomplished in 2001 (USFS 2001).

The Binarch Creek watershed is mostly forested and steep sloped, but much of the stream is low to moderate gradient meandering through an uncontained floodplain in a wide valley bottom. In 1989 a 660 acre Binarch Creek Research Natural Area (RNA) was established, an area surrounding a 2.5 mile middle stream segment. RNA status was justified by principle distinguishing features (USFS 1989) including: 1) senescent and active beaver dams and ponds, 2) marshes and wet meadows, 3) riparian vegetation of the stream and adjacent marshes and wet meadows that harbor numerous reptiles, birds, and mammals, and 4) an unusually diverse assemblage of aquatic plants and animals including a pure strain of westslope cutthroat trout.

The WBAG II stream index scoring for two BURP sites within a mid-lower, low gradient reach just downstream of the RNA boundary is as follows:

- SMIs = 24 and 26, or Condition Rating = Minimum Threshold,
- at one BURP site, SFI = 65, or Condition Rating = 1, and
- at one BURP site SHI = 42, or Condition Rating = 1.

The WBAG II preliminary beneficial use assessment for CWAL is Not Fully Supporting based on the SMI scores of Minimum Threshold.

Besides the single BURP electro-fishing site, USFS electro-fished seven reaches from the mouth to the headwaters (USFS 2001). Taken together, the SFI range from the eight electro-fishing sites was SFI = 55 – 88, with mean SFI = 74 or Condition Rating = 2. Above average scores within the SFI metrics were related to the presence of cutthroat trout with overall good density (catch per unit electro-fishing effort). Low metric scores were generally due to the failure to detect slimy sculpin within mid to lower reaches.

In the draft *Addendum* (Rothrock 2002) it was concluded that CWAL = FS in Binarch Creek, and that sediment be removed as a pollutant of concern from the §303(d) listing. This conclusion and recommendation was based on the following reasons:

- The BURP scores for macroinvertebrates at the mid-lower sites represent slow water, silt-sand substrate, beaver pond type habitats.

- The DEQ and USFS electro-fishing results show a dominance of cutthroat trout except near the mouth, and the average score from eight sample sites of SFI = 74 produces a good, Condition Rating = mid-range 2.

- While the mid-lower BURP habitat score was poor, this scoring was in a beaver pond type habitat with natural characteristics that produces low BURP scores. The Binarch Creek RNA was in part established because of recognized "senescent and active beaver dams and ponds, marshes and wet meadows, riparian vegetation of the stream and adjacent marshes that harbor numerous reptiles, birds, and mammals, and an unusually diverse assemblage of aquatic plants" (USFS 1989).

- Within the boundaries of the Binarch Creek RNA, there is a prohibition of land use activities such as road building, timber harvesting, and cattle grazing.

- Sediment load calculations of current condition in the Binarch Creek watershed (Rothrock 2001), are low – moderate on a basin wide comparison, and relate to a low – moderate active road density of 2.2 mi/mi^2 and a stream crossing density of 1.2 crossings/mile of stream.

Comments to the draft *Addendum* report debated the conclusion of non-impairment by sediment (Appendix D). This included an EPA comment that "the information currently presented does not fully support the recommendation for sediment de-listing." Comments pointed to the USFS 1998 stream survey which found: a moderate amount of fine sediment in gravel beds of upper stream reaches which would serve as cutthroat spawning areas; observations that overall pool quality in upper reaches was poor because of filling in by sand; and high percent fines in mid to lower channel reaches (USFS 1998). Comments stated that significant sediment input related to timber sales between 1960 – 1996 could not be discounted. Approximately 43% of the watershed was harvested in those years with many acres of clear cuts, along with a high road density of 5.9 miles/mi^2 to service the timber sales.

The support status for this final *Addendum* report is established as CWAL = NFS, based on: 1) the mid-lower reach BURP results, 2) the absence of a BURP site within the upper one-half of the stream even though USFS surveys produced good SFI scores, and 3) moderate to high

percent fines throughout the stream in which the timber sale and road activity between 1960 – 1996 cannot be discounted as contributing to sediment impairment.

A sediment TMDL for the Binarch Creek watershed was prepared (Section 5.2). Natural background sediment load was estimated at 266 tons/year. Load capacity for the Priest River Subbasin is set at 50% above background which includes a margin of safety (Rothrock 2001), or 399 tons/yr for the Binarch Creek watershed. Existing sediment load was estimated at 472 tons/yr, or 77% above background. Sediment load and reduction allocation is made to the single ownership/management, USFS. Opportunities for significant reduction in sediment yield from the current unpaved road network appear to be limited. It is perceived that impairment from excess sedimentation relates to the legacy of rather extensive timber harvests and road construction. Keeping Binarch Creek on the §303(d) list as impaired with sediment as the pollutant of concern essentially translates to a "rest and recovery" requirement within the watershed.

Under the current guidance of WBAG II and additional considerations, the appropriate measures of Full Support for Binarch Creek include: 1) scores of SMI, SFI, and SHI which integrated together produce an average Condition Rating score ≥ 2.0, 2) maintenance or improvement of the cutthroat trout density at the minimum target levels of 5 – 10 cutthroat /100 m^2, 3) presence of sculpins in reaches below 4% stream gradient, and 4) meeting instream targets set for surrogate habitat characteristics such as percent bed fines and residual pool volume.

Binarch Creek is considered secondary contact recreation. There are no bacteria data to assess the standards criteria. The WBAG II screening procedure (Grafe *et al*. 2002) determines that there is low potential risk for bacteria contamination. Support status for contact recreation is assigned Fully Supporting.

A temperature sensor was placed in Binarch Creek by DEQ in 2000. The data showed exceedances of the state standards numeric temperature criteria for cutthroat spawning and incubation. Under the guidelines of WBAG II, Binarch Creek will be listed for temperature in the 2002/03 DEQ §303(d) list. Based on a negotiated TMDL settlement schedule, the due date for a Binarch Creek temperature TMDL is 2007 (Table B).

East River

Sediment

The East River watershed is 43,163 acres (Figure B). The Middle Fork East River is a 3rd order stream that flows 9 miles almost due west until the confluence with the North Fork. The North Fork is a 3rd order stream that flows 10 miles southwest to its confluence. At the confluence of the forks, the 4th order main stem flows 2.8 miles to the mouth at Lower Priest River. The Middle Fork was de-listed for sediment in the 1998 DEQ §303(d) list (DEQ 1999), and the North Fork was recommended for sediment de-listing in the *Priest River SBA and TMDL* (Rothrock 2001). The main stem was delayed for a beneficial use status call until DEQ and IDL conducted an electro-fishing survey, which was accomplished in 2001.

Ownership/management within the watershed is 87% Idaho state lands managed by IDL, 8% federal lands primarily as the Priest River Experimental Forest, 3% private agricultural and rural residential property, and 2% industrial timber lands.

The East River drainage takes on an additional management emphasis as it is the only stream system of the Lower Priest River Subbasin where in recent time, bull trout have been captured and observed spawning.

The WBAG II stream index scoring for the East River main stem BURP site (SMI and SHI in 1995 sampling, SFI in 2001 electro-fishing) is as follows:

- SMI = 60, or Condition Rating = 2,
- SFI = 72, or Condition Rating = 2, and
- SHI = 50, or Condition Rating = 1.

The WBAG II preliminary beneficial use assessment for CWAL is Not Fully Supporting based on integration of indexes which produce an average Condition Rating = 1.7 (CR < 2.0 = fail). It seems to this assessor that beneficial use status is borderline between Full Support and Not Fully Supporting. If Not Fully Supporting is the determined status call, there is an uncertainty as to whether CWAL has been impacted by excess sediment from land use activities.

The recommended decision is Not Fully Supporting, based on the following information at hand:

- while the BURP macroinvertebrate sample depicts a satisfactory condition of clean, cold water insects, and the SFI score was satisfactory, the electro-fishing survey produced a low total salmonid abundance of 0.5 catch per minute effort, and a low qualitative density estimate of 1.3 total salmonids/100 m^2, well below the subbasin target salmonid density. The dominant salmonid in the main stem survey was brook trout, with only a single bull trout juvenile sampled, and no captured cutthroat.

- BURP habitat scores and other habitat evaluations show poor conditions within the main stem. This primarily relates to lack of LWD and instream cover, and a shallow, wide stream with poor riparian bank cover and stability, and eroding streambanks. There are large pools within the reach with good residual pool volume, but other pool quality characteristics are poor. BURP sampling did show that within sampled rifles, there were low percent fines and low embeddedness, and good distribution of pebble sizes through small cobble.

- It is known that part of the damaged and eroding streambank condition can be related to the history of land use activities.

- Lastly, sediment load calculations for the entire East River watershed (Middle Fork, North Fork, and main stem) produced an existing annual sediment load 185% above natural background. There were identified areas of excess sediment yield and opportunities for load reductions. Contradicting that sediment load is a cause for beneficial use impairment is the evaluation that the Middle Fork clearly meets the

various criteria for CWAL Full Support, and the calculated annual sediment load is 157% above background (Rothrock 2001). Middle Fork is overall a fairly steep gradient stream (two-thirds of the Middle Fork main stem >1.5% gradient), and therefore may primarily be a sediment transport stream.

The East River main stem should be retained on the §303(d) list. Reasons for impairment could be related to: elevated water temperatures, historic removal of riparian conifers and therefore a reduction in LWD recruitment, a widening of the stream channel with damaged and eroding streambanks, and significant stretches of thick, sandy substrate. The degree to which sediment load from land use activities throughout the watershed, over the last several decades, relates to or has caused impairment is unknown. But it seems that sediment load cannot be discounted as a contributing cause.

A sediment TMDL for the entire East River watershed (excluding the Lost Creek subwatershed) was prepared (Section 5.3). Background sediment load was estimated at 1,032 tons/year. Load capacity is set at 50% above background, or 1,548 tons/yr. Existing sediment load was estimated at 2,937 tons/yr, or 185% above background. Sediment load allocations and sediment reduction allocations were made to the four ownership/management entities in the watershed, and also to Bonner County maintained roads.

Under the current guidance of WBAG II and additional considerations, the appropriate measures of Full Support for East River main stem include: 1) scores of SMI, SFI, and SHI which integrated together produce an average Condition Rating score ≥ 2.0, 2) a total salmonid density at the minimum target levels of 5 – 10 total trout/100 m^2, 3) three or more salmonid age classes including juveniles (<100 mm), 4) appropriate instream targets for surrogate habitat characteristics, and 5) in addition to the biological and habitat measures, the TMDL Implementation Plan may address fisheries management objectives regarding rearing conditions for juvenile and sub adult bull trout and cutthroat trout.

Dissolved Oxygen

Based on measurements taken by DEQ in early September 2001, this subbasin assessment determines that the East River main stem, the Middle Fork, and the North Fork do not violate standards dissolved oxygen numeric criteria. It is recommend that these water bodies be removed from the §303(d) list for DO (Table B).

Water Temperature

IDL and DEQ placed temperature sensors in the Middle Fork, North Fork, and main stem from 1997 - 1999. This data shows that except in the headwaters of the Middle Fork, there are exceedances of the state standards numeric temperature criteria for cutthroat and bull trout spawning and incubation, and the EPA bull trout juvenile rearing and adult spawning criteria.

Under the guidelines of WBAG II a temperature TMDL is required for the East River drainage. Because water temperature was explicitly listed in the 1994/96 §303(d) list for East River, agreements between EPA and DEQ call for immediate evaluation of data and presentation of a temperature TMDL if warranted. A temperature TMDL has been prepared and is presented in Section 5.4.

The East River temperature TMDL utilizes the IDL- CWE Canopy Closure – Stream Temperature protocol (IDL 2000a). This method calculates increases in stream shade needed to achieve water temperatures that approach the EPA bull trout juvenile rearing and spawning criteria for July – mid September (10 °C - 7 day moving average of daily maximum temperatures). Existing percent canopy cover and increased canopy cover needed, are thus surrogate measures of heat loading per unit area per time.

From the mouth of East River main stem at elevation 2230 ft to elevation 4000 ft, the CWE model calculates 100% canopy cover required to approach a 10 °C maximum weekly maximum temperature (MWMT) that relates to the EPA bull trout criteria. The majority of stream segments within the watershed fall within these elevations. The CWE protocol to estimate existing percent canopy cover utilizes evaluation of aerial photographs under a stereoscope. For the East River main stem, and the lower one-half of the Middle Fork and North Fork main stems, existing conditions range from 5% to 80% canopy cover. This equates to 20% to 95% canopy cover increases needed to meet the calculated canopy target.

The East River temperature TMDL is presented as tables with evaluations and calculations for each stream segment between 200 foot elevation contours. For each segment the TMDL tables include: 1) existing percent canopy cover, 2) CWE calculated percent target canopy cover needed to approach 10 °C MWMT, 3) canopy cover increase to meet target calculations, 4) calculations that estimate target heat load capacity, current heat loading, and target heat load reduction in watts/m^2, and 5) land ownership and assumed responsibilities for TMDL implementation.

There has been impact to the riparian zone vegetative cover of the East River drainage from land use activities. Prior to enactment of the Idaho FPA in 1974, there were minimal or no restrictions of harvesting timber within the riparian zones of streams. Historic accounts clearly show cases of significant large tree removal in this zone. Even in current times under the FPA, there is an allowable take within the stream protection zone (SPZ). In addition, clearing of land for agricultural purposes in basin lowlands has resulted in significant removal of riparian cover. There also has been damage to the riparian zone and streambanks from large animal access. Widening of some stream reaches may have been accelerated because of the above mentioned riparian zone impacts, plus an effect from excess sediment deposition.

Given that impacts have occurred from land use activities, it is unlikely however that the CWE calculated canopy targets can be considered background or natural canopy cover. It is unlikely that 100% cover uniformly existed historically between 2,200 – 4,000 feet elevation due to factors such as: large rock formations, landslides, marsh conditions that prohibit conifer growth, wide stream widths, and a reoccurring wildfire cycle. It is just as unlikely that a 100% canopy cover between these elevations can be achieved through active riparian zone management because of the above factors, and also including man-induced factors such as adjacent transportation roads. Thus, the temperature TMDL presented represents an interim load capacity until sufficient research can be done to define and map the potential maximum riparian vegetation density and stream canopy cover that could be achieved under current stream and adjacent watershed conditions.

Lower Priest River

Lower Priest River originates as outlet from Priest Lake and flows south to the confluence with Pend Oreille River (Figure B). By the time it reaches its mouth it is a 5th order river. The §303(d) listed segment begins at the tributary inflow point of Upper West Branch Priest River. From this point to the mouth the distance is 34.4 river miles, and the average gradient over this river length is 0.15%. Lower Priest River was delayed for a beneficial use status call until the Idaho River Ecological Assessment Framework (IREAF) was in final form, and until IDFG conducted an electro-fishing survey, which was accomplished in spring 2002. Beneficial uses for Lower Priest River are designated in the Idaho water quality standards as: domestic water supply, cold water aquatic life, primary and secondary contact recreation, and as a special resource water (IDAPA 58.01.02.110.06).

Watershed size draining into the listed river segment is 219,980 acres, with approximately 475 miles of perennial streams. Ownership/management within the drainage is: 50% IPNF land under USFS management; 31% state lands managed by IDL; 17% private agricultural, timber, and rural residential property (both in Idaho and Washington); and 2% industrial timber lands.

The WBAG II river index scoring for one BURP site at river mile 16.2, one USGS electro-fishing survey in September 1998 near river mile 3.8, and one IDFG electro-fishing survey in April 2002 from river mile 7.5 to near the mouth, is follows:

- BURP River Macroinvertebrate Index (RMI) = 23, or Condition Rating = 3,
- BURP River Diatom Index (RDI) = 37, or Condition Rating = 3,
- USGS River Fish Index (RFI) = 29, or Condition Rating = Minimum Threshold, and
- IDFG RFI = 45, or Condition Rating = Minimum Threshold.

The WBAG II preliminary beneficial use assessment for CWAL is Not Fully Supporting based on the RFI scores of Minimum Threshold from USGS and IDFG sampling. As a point of emphasis, the USGS sampling site, in the vicinity of the river mile 3.8 gaging station, was 12 river miles south of the BURP site. The IDFG sampling, from river mile 7.5 to the mouth, is again some distance south of the BURP site. Input – output access of boats for river electro-fishing is very difficult in the vicinity of the BURP site.

In the September USGS survey, largescale sucker and northern pikeminnow were dominant in the sampling, and mountain whitefish was the only salmonid captured. During this cool - warm water period, it might be expected that other salmonids such as cutthroat trout might seek refuge in selected pools within the river, or migrate into colder water feeding tributaries (DuPont *pers comm*). In the April IDFG survey, mountain whitefish and largescale sucker were dominant. The sampling included cutthroat, rainbow, and brown trout, but at low occurrence. RFI metrics from both surveys that scored low included: number of cold water species, percent sculpin, percent sensitive native species, percent tolerant individuals (high percent), and number of salmonid age classes (mountain whitefish are not included in this metric).

In the draft *Addendum* (Rothrock 2002) it was recommended that sediment be removed as a pollutant of concern from the Lower Priest River §303(d) listing. This recommendation was based on the following considerations:

- IDFG theorizes that primary factors relating to the low RFI scores include: 1) cool - warm water temperatures from July – mid September, 2) habitat degradation of historical tributary spawning beds of fluvial and adfluvial cutthroat trout and bull trout, and 3) the effect of competition from the introduced lake trout in Priest Lake and brook trout in basin streams. It is not believed that sediment within the river is a major factor for suppression of cold water aquatic life.

- That sediment is not a major contributing cause seems to be supported by the macroinvertebrate and periphyton data collected at the BURP site which show a good clean water condition with Condition Rating = 3 for both RMI and RDI (Full Support).

- For salmonid spawning beneficial use, the IREAF calls for support determination by the IDFG. Of the salmonid species that exist in Lower Priest River, the species that will primarily utilize river habitat for spawning is the mountain whitefish, *Prosopium williamsoni* (Horner *pers comm*). IDFG believes that mountain whitefish have maintained a viable population in the river (whitefish in the IDFG survey was 55% of total catch). Length range of whitefish from the USGS and IDFG surveys was 84 - 418 mm. This data suggests Full Support for salmonid spawning beneficial use. A small population of introduced rainbow trout does appear to still exist in the river. Rainbow trout may spawn in river gravel beds.

Comment packages to the draft document disputed the recommendation of removing sediment as a pollutant of concern (Appendix D). EPA concluded, "the information currently presented does not fully support the recommendation for sediment de-listing." Comments pointed to statements in the draft report of severe erosion observed during a 2000 riverbank survey (the data work-up of survey results presented in this final version was not available for the draft), and that sediment input to the river from three major drainages was considered as significant.

This final version of the subbasin assessment determines that sediment within the river cannot be discounted as a contributing factor in the decline of the fluvial cutthroat fishery, and will remain as a listed pollutant of concern on the §303(d) listing. A sediment TMDL for Lower Priest River has four separate components: 1) an EPA approved sediment TMDL for the Lower West Branch watershed as presented in the initial *Priest River Subbasin Assessment and TMDL* (Rothrock 2001), 2) a sediment TMDL for the East River watershed presented in Section 5.3 of this *Addendum* report, 3) a sediment TMDL that will be developed for the Upper West Branch watershed resulting from this stream being newly listed in the pending 2002/03 DEQ §303(d) list, and 4) a riverbank sediment TMDL presented in Section 5.5 of this *Addendum* report.

The TMDL for Lower Priest River bank erosion begins by assigning a 90% bank stability regime as the interim load capacity. Based on back calculation from the 2000 riverbank survey (covering 9.3 river miles), sediment load from 10% bank instability is estimated at a 5,946 tons/yr load capacity for 34.4 river miles. Existing sediment load coming from a measured condition of 28% bank instability was estimated at 16,030 tons/yr. Improvement projects reducing current bank condition to 10% instability (stabilizing 12.1 miles of riverbank), would

reduce sediment load by an estimated 10,084 tons/yr. Sediment load and reduction allocations will be made to three ownership/management groups: USFS, state of Idaho, and private ownerships.

The Lower West Branch sediment TMDL assigned an interim loading capacity of 4,018 tons/yr with an estimated current sediment load of 7,416 tons/yr. The East River sediment TMDL assigned an interim loading capacity of 1,548 tons/yr with an estimated current load of 2,937 tons/yr. A sediment TMDL for Upper West Branch has yet to be developed.

Under the current guidance of WBAG II and additional considerations, the appropriate measures of cold water aquatic life Full Support for Lower Priest River would include: 1) scores of RMI, RDI, and RFI which integrated together produce an average Condition Rating score ≥ 2.0, 2) cold water fishery targets as established by the IDFG and presented in a TMDL Implementation Plan. This should include an ecological evaluation of existing and potential fisheries in relation to factors such as flow regime, water temperature, spawning habitat in tributaries, non-native salmonid species, and nonpoint source sedimentation, and 3) meeting instream targets set by a WAG for surrogate habitat characteristics such as pool quality and residual pool volume.

USGS placed a temperature data logger at the river mile 3.8 gaging site from June – September of 1998 and 2000. This data showed that the state standards numeric temperature criteria for CWAL (19 °C daily mean) was exceeded 44% of the criteria days in 1998, and 27% in 2000. Based on lines of evidence outlined in WBAG II, it is determined that at this point in time CWAL is an appropriate designated use for Lower Priest River. Therefore, there is a violation of the standards and the support status is Not Fully Supporting.

Lower Priest River will be listed for water temperature in the 2002/03 DEQ §303(d) list (Table B). Based on a negotiated TMDL settlement schedule, the due date for a Lower Priest River temperature TMDL is 2007. This will provide needed time to evaluate canopy cover and stream temperature potential of feeding tributaries, as well as river thermal potential, for the TMDL calculations. From this analysis, DEQ may seek a designated use change to seasonal cold water aquatic life (IDAPA 58.01.02.250.03).

1. Subbasin Assessment – Watershed Characterization

The federal Clean Water Act (CWA) requires that states and tribes restore and maintain the chemical, physical, and biological integrity of the nation's waters (33 USC § 1251.101). States and tribes, pursuant to section 303 of the CWA are to adopt water quality standards necessary to protect fish, shellfish, and wildlife while providing for recreation in and on the waters whenever possible. Section 303(d) of the CWA establishes requirements for states and tribes to identify and prioritize water bodies that are water quality limited (i.e., water bodies that do not meet water quality standards). States and tribes must periodically publish a priority list of impaired waters, currently every two years. For waters identified on this list, states and tribes must develop a total maximum daily load (TMDL) for the pollutants, set at a level to achieve water quality standards. This document addresses the water bodies in the Priest River Subbasin that have been placed and remain on what is known as the "303(d) list." (Figure 1).

The overall purpose of this addendum to the subbasin assessment and TMDL is to characterize and document pollutant loads within watersheds of the Priest River Subbasin that were delayed for beneficial use status determinations in the *Priest River Subbasin Assessment and TMDL* (Rothrock 2001). The first portion of this document, the subbasin assessment, is partitioned into four major sections: watershed characterization, water quality concerns and status, pollutant source inventory, and a summary of past and present pollution control efforts (Chapters 1 – 4). This information will then be used to develop a TMDL for each pollutant of concern for watersheds in the Priest River Subbasin that are determined as Not Full Support of a beneficial use (Chapter 5).

1.1 Introduction

In 1972, Congress passed public law 92-500, the Federal Water Pollution Control Act, more commonly called the Clean Water Act. The goal of this act was to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters" (Water Pollution Control Federation 1987). The act and the programs it has generated have changed over the years as experience and perceptions of water quality have changed. The CWA has been amended 15 times, most significantly in 1977, 1981, and 1987. One of the goals of the 1977 amendment was protecting and managing waters to insure "swimmable and fishable" conditions. This goal, along with a 1972 goal to restore and maintain chemical, physical, and biological integrity, relates water quality with more than just chemistry.

Background

The federal government, through the U.S. Environmental Protection Agency (EPA), assumed the dominant role in defining and directing water pollution control programs across the county. The Idaho Department of Environmental Quality (DEQ) implements the CWA in Idaho, while the EPA oversees Idaho and certifies the fulfillment of CWA requirements and responsibilities.

Section 303 of the CWA requires DEQ to adopt, with EPA approval, water quality standards and to review those standards every three years. Additionally, DEQ must monitor waters to identify those not meeting water quality standards. For those waters not meeting standards, DEQ must establish TMDLs for each pollutant impairing the waters. Further, the agency must set appropriate controls to restore water quality and allow the water bodies to meet their designated

uses. These requirements result in a list of impaired waters, called the "303(d) list." This list describes water bodies not meeting water quality standards. Waters identified on this list require further analysis. A subbasin assessment and TMDL provide a summary of the water quality status and allowable TMDL for water bodies on the 303(d) list. *Addendum: Priest River Subbasin Assessment and TMDL* provides this summary for the currently listed waters in the Priest River Subbasin.

The subbasin assessment section of this report (Chapters 1 – 4) includes an evaluation and summary of the current water quality status, pollutant sources, and control actions in the Priest River Subbasin to date. While this assessment is not a requirement of the TMDL, DEQ performs the assessment to ensure impairment listings are up to date and accurate. The TMDL is a plan to improve water quality by limiting pollutant loads. Specifically, a TMDL is an estimation of the maximum pollutant amount that can be present in a waterbody and still allow that waterbody to meet water quality standards (40 CFR § 130). Consequently, a TMDL is waterbody- and pollutant-specific. The TMDL also includes individual pollutant allocations among various sources discharging the pollutant. The EPA considers certain unnatural conditions, such as flow alteration, a lack of flow, or habitat alteration, that are not the result of the discharge of a specific pollutants as "pollution." TMDLs are not required for water bodies impaired by pollution, but not specific pollutants. In common usage, a TMDL also refers to the written document that contains the statement of loads and supporting analyses, often incorporating TMDLs for several water bodies and/or pollutants within a given watershed.

Idaho's Role

Idaho adopts water quality standards to protect public health and welfare, enhance the quality of water, and protect biological integrity. A water quality standard defines the goals of a waterbody by designating the use or uses for the water, setting criteria necessary to protect those uses, and preventing degradation of water quality through antidegradation provisions.

The state may assign or designate beneficial uses for particular Idaho water bodies to support. These beneficial uses are identified in the Idaho water quality standards and include:

- Aquatic life support – cold water, seasonal cold water, warm water, and salmonid spawning
- Contact recreation – primary (swimming), secondary (boating)
- Water supply – domestic, agricultural, industrial
- Wildlife habitats, aesthetics

The Idaho legislature designates uses for water bodies. Industrial water supply, wildlife habitat, and aesthetics are designated beneficial uses for all water bodies in the state. If a waterbody is unclassified, then cold water and primary contact recreation are used as additional default designated uses when water bodies are assessed.

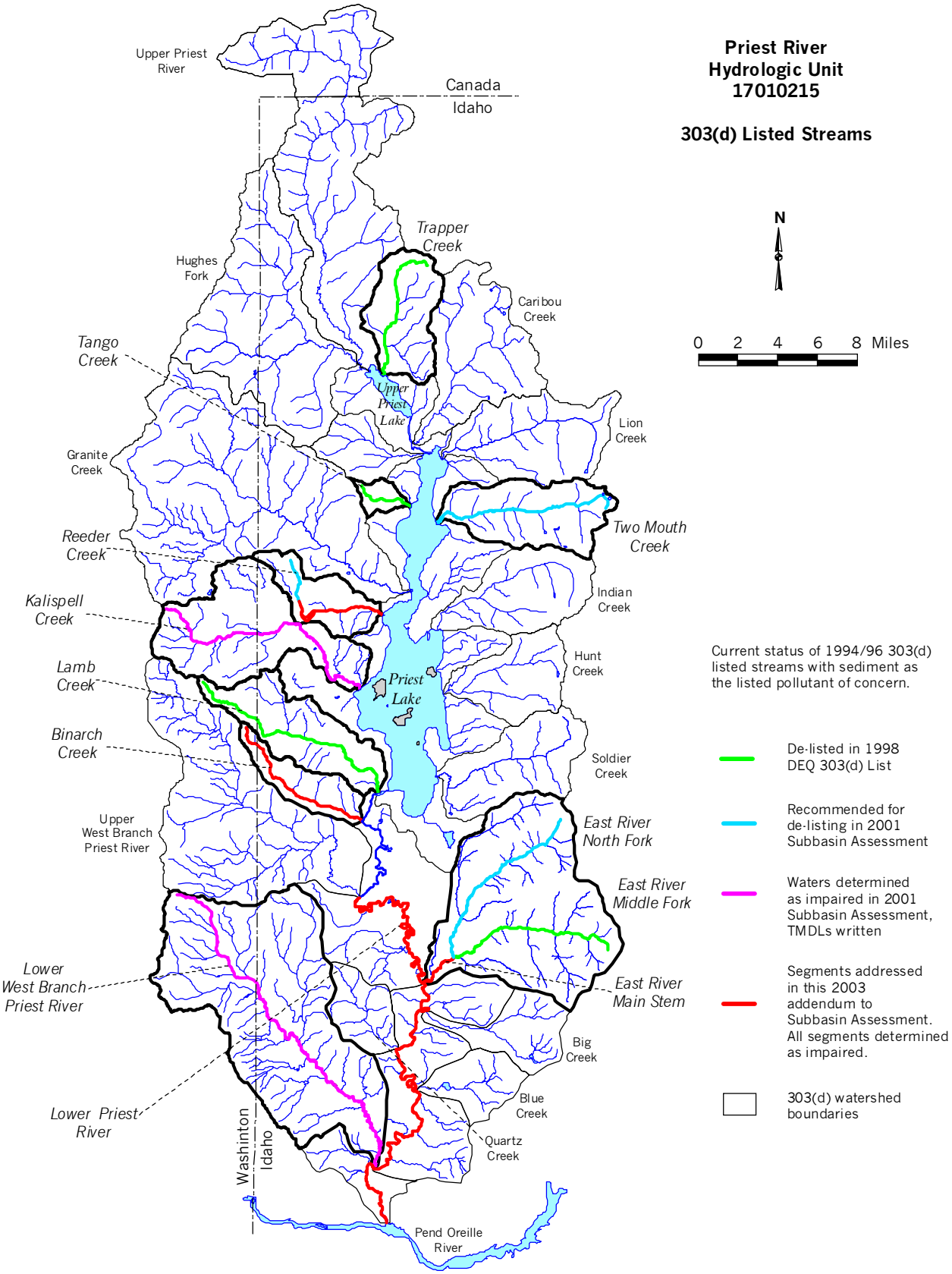

Figure 1. §303(d) listed stream segments of the Priest River Subbasin.

A subbasin assessment entails analyzing and integrating multiple types of waterbody data, such as biological, physical/chemical, and landscape data to address several objectives:

- Determine the degree of designated beneficial use support of the waterbody (i.e., attaining or not attaining water quality standards).
- Determine the degree of achievement of biological integrity.
- Compile descriptive information about the waterbody, particularly the identity and location of pollutant sources.
- When water bodies are not attaining water quality standards, determine the causes and extent of the impairment.

1.2 Physical and Biological Characteristics

Physical and biological attributes within the Priest River Subbasin were presented in the *Priest River SBA and TMDL*, Section 2.1.1, pages 6 – 21 (Rothrock 2001). Discussion topics were: climate, hydrology, geology and soils, vegetative cover and wildfire, fisheries, and stream characteristics.

1.3 Cultural Characteristics

Cultural characteristics within the Priest River Subbasin were presented in the *Priest River SBA and TMDL*, Section 2.1.2, pages 21 – 28 (Rothrock 2001). Discussion topics were: land ownership and land use, protected river designations, minimum stream flow, appropriated water use, regional history and population, area industry, and local groups working on water quality issues.